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THE LOCATION OF INDUSTRY IN UNDERDEVELOPED AREAS

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THE LOCATION OF INDUSTRY IN UNDERDEVELOPED AREAS

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1. Some General Principles

A considerable period has elapsed since the time of Jochann Heinrich von Thünen, but the economic singificance of space has not ceased to grow. The overcoming of distances made possible by the vertiginous pace of technology and revolutionary social emancipation has enabled each individual region to valorize its specific potentials in as complementary as possible entaties. It has been providing a strong impetus for two basic tendencies of rational production - specialization and integration - and has also by fostering the incessant impulse of reaching the others resulted in growing labour productivity and a steady widening of markets. Regional aspects have imposed themselves as the primary component of contemporary economic development.

G. Palombe's definition "development is the gradual and temporally continued growth of national monetary income per capita"[1] cannot be satisfactory. It conceals the untenability of regional contrasts and the lack of movements towards new social formations. It also does not take into account space as an active factor of economic growth.

The location of industry can nowadays be considered only from the viewpoint of the optimum development of the whole. The micro-analyses of the individual location of an industrial undertaking does not, of course, lose anything of its content, it has now even become more subtle than ever before, but it must start from the functional relationships towards the whole. This functional relationship is even more important for less-developed areas, no matter whether we take the conventional approach to the problem of location, considering the selection of an appropriate space for a certain industry, or its exact opposite - as it has, for instance, been done by R. Pré[2] - considering the selection of an industry for a certain space.

There is no qualitative distinction in the application of the general functional principle in the location of industry between a homogenously underdeveloped country and an underdeveloped region (within a country). In both cases macro-adequate location is a direct prerequisite for speedy growth, and in the case of underdeveloped regions it also contributes to the efforts of the developed ones in assisting them. The practical orientations, to use Weber's well-known term, are mainly the same in both cases.

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1) Giuseppe Palomba, "Nuovi e vecchi interrogativi intorno alla realtà dello sviluppo economico" published in the series "Gli aspetti sociali dello sviluppo economico", Milano, 1961.

2) Roland Pré, "The Location of Industry", paper presented at the Second Study Conference of the OECE on the Problems of Economic Development, Madrid, 1961.

The first of them naturally refers to the reaching of maximum accumulation and of its effectiveness. The new industry should, in the first place, exert a minimum pressure on the national accumulation and it should, moreover, once it had been constructed, supply the national accumulation with as large as possible provisions. The choice of the location will be justified if it enables the lowest possible direct investments per capacity unit and, in particular, minimum additional investments concerning the infra-structure, non-economic activities and housing projects. In connection with the degression of investment costs, priority should be given to locations whose highly concentrated raw material or power supplies constitute a basis for the establishment of as large as possible production capacities. The complex exploitation of the raw material substance can also constitute a significant motive in this direction. Rationalization resulting from construction undertaken on sites provided with large quantities of available building material should not be underestimated either. On the other hand, unnecessary surplus investments need not be the only factor having a negative effect on accumulation. Location unfavourably selected as far as raw material or power supplies and consumption centers are concerned, provided even that the existing infra-structure elements (transport, long distance mains, et al.) are of sufficient capacity, has the same effect as it results in comparatively increased production costs.

Owing to the fact that the problem of agriculture in the process of the accelerated industrialization of underdeveloped areas has become increasingly more acute, it is important to have an appropriate layout of the industry organically connected to agriculture represent an as effective as possible incentive for its further development. Industrial activities absorbing agricultural raw materials will rightly have to be developed in areas of strong agricultural production not only owing to the economy of transport, the reducing of damages of the material during transport, and handling to a minimum and the opportunity for the complex use of raw materials and refuse, but also owing to the advantages resulting from organizational business integration of industry and agriculture (combined industrial and agricultural concerns and other forms) in order to bring about the highest possible rate of efficiency and economy for the entire production and processing cycle of agricultural products. Likewise industrial activities providing agriculture with machinery and chemicals will mostly contribute to its modernization and the radical increase of agricultural crops, if located in the very centre of agricultural areas. It is there that they provide the best safeguards for a rational organization of the very important lashe maintainence services of agricultural machinery and implements, those for the distribution and mixing of fertilizers and of livestock fodder, et al.

The third important question of industrial location is connected with the balance of payment. The problem of balance of payment in foreign trade exchange is increasing just as the underdeveloped area is developing its own industry, for, on the one hand, the growing income of the population and the increased capacity of the industry are more and more absorbing the export surpluses of food and agricultural raw materials, and on the other industrialization is steadily increasing the demands for imports of machinery and reproduction materials. Thus, during a comparatively long development stage, the threats of an unbalanced foreign exchange are constantly remaining open and it is therefore not immaterial what the relationship of the location of industry is to that problem. It is obviously already indirectly alleviated by the favourable effects on the development of agriculture and on its capacity of being as active as possible in its foreing exchange balance resulting from properly selected location. Other advantages might be brought about if industry oriented to the export market is constructed on points favouring its competitive capacity on foreing markets in connection with transport costs, available power resources, productivity and skilled manpower, et al.; or if it is constructed on points where the opportunities for the integral use of raw materials and refuse contribute to savings in foreign currency intended for imports.

The lack of skilled personnel constitutes, as a rule, a considerable deficiency of underdeveloped areas. A proper policy of location will endavour to safeguard as much as possible the most effective use of distinguished highly skilled technical, commercial and, in particular, administrative personnel. This means for a large number of industrial activities practically construction within the framework of large urban agglomerations - particularly for those comprising complex technological manufacturing procedures, as well as for those which owing to their being oriented to the export market are subjected to severe international competition. It is there that numerous institutions of higher learning, research institutes, designing bureaus, various services, et al. provide much greater opportunities for the training and promotion of highly skilled personnel, the adequate preparation of the manufacturing programme, and efficient business representation. They also provide the best conditions for organizing the vitally important development research activities which have been proved by experience to appear as a strong tool to alleviate the serious foreign exchange problem in a period of general economic growth of underdeveloped countries by securing their own technological solutions, to substitute those coming from abroad, and by their emancipation from excessive imports of foreign reproduction materials.

As it can be easily seen, all these "orientations" do not represent pure, specific motives of industrial location in underdeveloped areas. They are, in addition to others, the principles of location in general. They have been stressed here owing to the higher meaning provided to them by the functional relationship with the main and regular problems of development of underdevbloped areas[3].

The specific motives arise out of the indispensability of changing the structure of the economy and of the population. It is possible that transformation cannot be carried out radically with sufficient speed and the necessary width if the national policy of location makes use only of the immediate economic effects. The already constructed industry, the stronger infra-structure and greater availability of technical institutions and experts in the more developed regions will in such a case decisively absorb the results of the new industrialisation, making the polarization of regional development even more acute, particularly if owing to certain reasons it is not possible to reach a satisfactory level of manpower mobility. The overcoming of the profound dualism in countries the developed regions of which are characterized by strong market economies, a large percentage of non-agricultural population and high per capita incomes, and the underdeveloped ones by a purely natural economy and agricultural overpopulation, is, however, in the long run as economic rather than a socio-political process. In the end, it will result in the general growth of social productivity and employment and in the maximum widening of the home market taking equally into account the interests of all parts of the country.

The policy of industrial location in underdeveloped areas, appearing even with new motives on behalf of these interests, can accordingly in a certain stage find itself facing a dilemma between immediate and long term economic effects. Temporary concessions are necessary for both directions, to have the intensity of efforts in underdeveloped regions either lowered or increased. What is essential, however, is to have and to consistently observe a long term plan of industrialisation of underdeveloped regions and to have the general policy of industrial location strictly follow its tendency.

It is here that a particularly important principle of locational policy in underdeveloped areas, more or less generally accepted, but often ignored in practice, should be remembered. The arbitrary dispersion of the industry

3) A synthetic presentation of these problems is provided by K. Martin's paper "The Economic Basis of Industrial Development" presented at the Second E.P.A. (O.E.E.C.) Conference Madrid, 1961.

along the entire surface of the area, in every backward commune or town, is a frequent deficiency of the industrial development of underdeveloped areas, usually arising out of lack of resistence to socio-political pressures. The principle of selective concentration of industrial development in certain centers is, however, supported by all economic reasons.

The "Method" of filling up all vacancies in the area by the construction of plants turns out sooner or later to be a serious brake in the development of the entire underdeveloped region owing to the globally uneconomic use of resources. Horror vacui applies to the movement of industry in space, just as well as to water in ancient physics. The extent taken up by a centre of industrialization is immaterial just as well as its relationship to the momentary administrative and territorial division; what is essential, however, is to utilize all the advantages of concentrated construction, obviously with certain reserves towards excessive urbanization.

2. From Weber up to the present day

As a conclusion the following elements can be taken:(a)an active relationship of economic policy towards the locations of industry is indispensable; (b) the first approach has to be macro-economic with all the general, as well as with the specific motives of industrial location; (c) micro-criteria maintain their full significance only in accordance with the postulates of the general economic policy of location.

It is hardly necessary to emphasize that only a fully and rationally directed mobility of the means provided by collective ownership and the planned economy built on it can produce the conditions required to reach these objectives. Contemporary trends are more and more going along this line, and an intense industrialization of underdeveloped areas has been properly started only where these conditions have at least partly been met[4].

It is likewise only from these aspects that the relevance and validity of the contributions provided by the substantial scientific activity referring to the problem of location carried out so far can be properly evaluated. It is also necessary to make allowances for the classical conceptions marked, out of obvious reasons, by the time and setting in which they had arisen. In the present-day period of irrepressible intergovernmental economic integration von Thünen's study of "the isolated state", Weber's investigation of the orientation for the selection of the most favourable location for the establishment of an industrial undertaking in "an isolated imaginary economic area",and Palander's[5] consideration of the whole process of formation of prices and location of industry within an "isolated state" must sound somewhat anachronistic;it was owing to that, as well as to some other reasons, that they were not able to envisage the tremendous role of the international division of labour as a locational factor. Or, similarly, if Weber, Palander and others have not realized the equally great significance of monopoly in the lay-out of production, the more so are their approaches removed from the contemporary are of collective (or "public") ownership.

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4) First of all, in countries with fully socialized means of production and planning including the entire economic activity, then in some recently emmerging countries of Africa and Asia as well as in those western countries where a strongly developed cestor of state ownership in the economy makes at least a partial application of planning methods possible.

5) Von Thünen s main work "Der Isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie" published in 1826, Weber "Uber den Standort der Industrien" 1909, Palander, "Beiträge zur Standortstheorie", 1935.

August Lösch[6] obviously seems to be considerably nearer in his approach, not so much because of his numerous remarks directed to Weber and his correct appreciation of the determining effect of profit on the lay-out of capitalist production, but rather owing to his unequivocal attitude to the general theory of location having to be approached only from the aspect of the economy of the country as a whole. This concept is still firmly established at present, and has, naturally, been most consistently expressed in the works of Fejgin, Kantorović et al., taking collective ownership over the means of production and a fully developed system of economic planning as the basis.

In the afore-mentioned paper, R. Pré places the whole problem of the location of industry in an underdeveloped area first of all in a functional relationship to its possible type and volume of foreign trade exchange. Fejgin quite rightly indicates some new correlations between the lay-out of production and the great achievments of contemporary technology, i.e., electrification, mechanisation, chemisation, the use of nuclear energy, et al.[7] The general theory of location has to be considered from a dynamic point of view.

It only remains to fill the gap in the theory of location as far as the specific framework of underdeveloped areas is concerned. Fragmentary contributions have become more numerous ever since S.R. Dennison's[8] pioneering contribution, but the size of the world's underdeveloped areas, the state of their economies and the urgency of the entire problem of theory of their speedy emancipation require the elaboration of a consistent theory of location in underdeveloped areas. It would have to be built on the new basis of material and social progress, without the anti-historicisms adopted, almost as a rule, by the scientists of the classic type. After having evaluated the behaviour and validity of "normal" locational "orientations" in the specific conditions of underdeveloped areas, it would study and define the specific motives of the lay-out of production in them.

Special attention should be paid to the quantitative, and possibly also qualitative, differentiation of locational problems concerning an underdeveloped country and an underdeveloped region, taking, however, the national and intergovernmental integrational processes fully into acount. The clash of the immediate and the long-term motives of locational policy conducted by a country in its more backward regions, in a certain stage, is an important field of research and clarification. The fundamental consideration of numerous practical problems, e.g. methods of concentration, selection of industrial activities for underdeveloped areas, adequate size of production capacities, etc., also cannot be avoided.

It is only in the full macro-aspect, with a horizon covering the locational interests of the whole, that the methods of micro-determination can be effectively used and valorized. Both the old and new routine procedures are very numerous and they can be used in accordance with the given specific conditions. If it is, for instance, the case of "transport orientation", it would certainly by unjustified to disregard the results that can be obtained by the critical application of Launhardt's locational triangle, or Polander's mechanical model, or Weber's isodopans, or Predöl's principle of substitution, et al., in determining the concrete location of an industrial undertaking within the framework of the national and regional economic plan. Moreover, it is only by dint of the exact

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6) The firs edition of Lösch's "The Economies of Location" was published in 1939, and the second in 1943.

7) J.G. Fejgin, "Razmeščenie proizvodstva pri kapitalizme i socializme", Moscow, 1958.

8) S.R. Dennison, "The Location of Industry and the Depressed Areas", Oxford, 1939.

methods of micro-treatment that all the advantages of the priority of the macro-approach can be fully utilized.

We should, however, bear in mind Lösch's cautious statement that theory can serve for the selection of the region in which the locational point for a new industrial undertaking can be looked for, rather than for the determining of the point itself.

3. Brief Survey of Yugoslav Experience

Underdeveloped areas constitute a considerable part of Yugoslavia, but the officially determined border has several times been modified in the course of the post-war period, depending on the existing opportunities for special economic intervention. The area determined as underdeveloped according to the Federal Five Year Plan 1961 - 1965 includes the People's Republics of Macedonia and Montenegro as well as the large southern parts of the People's Republics of Serbia, Croatia and Bosnia and Herzegovina. An area of 105,450 square kilometres (approx. 41 percent of the national territory) is inhabited by a population of 6.2 million (approx. 1/3 of the entire population), their national income per capita amounting, in 1960, to about 45 percent of the per capita income in the more developed areas. In the same year, 1960., there were 825 industrial plants, predominantly tied to the local sources of raw materials, operating in the under developed area. The majority of them represent plants for the processing of agricultural produce (food and tobacco, 175), they are followed by the non-metal and construction material industries (163), as well as by the wood industry (135). These activities account for 57 percent of the entire industry in the underdeveloped area.

Roughly speaking, however, the genuinely underdeveloped regions mainly overlap with the area lying southwards from the line Sava-Danube[9]. This area includes 2/3 of the entire Yugoslav agricultural population and a very considerable part of the national raw material resources (metals, non-metals, wood, energy sources, agricultural raw materials), thus constituting the main basis for the further industrialization of the country. Owing to these as well as to some other reasons, the accelerated economic development in the underdeveloped regions has been the omnipresent motive of our postwar efforts, and our seventeen year experience can also be instructive for others.

The following brief characterization of the Yugoslav relationship to the industrialization of underdeveloped regions seems to be justified: (a) a constantly active attitude; (b) the presence of the macro-approach; (c) the absence of a specific locational conception for underdeveloped areas; (d) methodological insufficiency of micro-treatment.

The first two characteristics need not be considered here. Their positive quality has marked the whole relationship and has more than offset the deficiences that have been expressed. The dimensions, modalities, and trends of intervention have always more or less expressed the balanced functional relation ship towards the entire economy of the country, and particularly in the course of the last five years efforts have become comparatively more significant as to their volume, and being more directed to the processing and refining industries, they are more appropriate in quality. The problems are mainly connected with the latter two characteristics, referring, in fact, to the very subject-matter of this modest contribution.

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9) In the area south of the Sava-Danube line every 1,000 square kilometres account for 8.7 industrial undertakings, as compared to 28.2 in the north, and 13.5 undertakings per each 100,000 inhabitants, as compared to 31.2 north of the Sava and the Danube (These estimates are based on" Adresar industrije FNRJ 1960").

A specific locational conception would have to be an appreciable contribution to the raising of the general effect of central government intervention in underdeveloped areas, and it would obviously also have a favourable impact on the evolution of the general industrial structure of the country. In order to establish it, it is necessary to define all its essential components.

The first of them referrs to the regional specialization of industrial development and to the composition of activities the capacities of which are growing in individual regions. This composition is in certain cases irrationally heterogenous, thus having developed areas and even large urban agglomerations crowded with activities engaged in basic products, semi-finished articles, et al., which would from the locational point of view be much more appropriate for the underdeveloped regions, particularly as far as the raw material resources are concerned. In the opposite case, however, it is much more difficult and timeconsuming for the underdeveloped regions to reach a full degree of efficiency in dealing with complex technological procedures in some undertakings for the satisfactory work of which they could not even realistically expect to provide all the necessary conditions.

The second component would deal with the determining of the focal points of industrial development in underdeveloped areas. The almost complete territorial diffusion of construction in certain regions has soon shown its reverse side, synthetized in a very low general capital coefficient. The more recent trends are more and more tending towards guided concentration of industrialization in places found by thoroughly and scientifically conducted analyses to be appropriate for it, but it still remains for the plans and instruments of economic policy to adopt such a trend.

The third basic component refers to the relationship between the location and the market. Provided that we can take "location and trade to be the two sides of the same coin"[10], this link has to be fully materialized in the shortest possible time, which on the one hand means the thorough methodological study of the relationship between the size of the plant and the market, and on the other the consistency of the provisions of economic policy on all its levels in order to have a location established by exact methodology reach its full market affirmation in the shortest possible time. There are, however, still considerable problems to be handled on both sides.

Conditions for the implementation of a specific locational concept for underdeveloped areas can be provided by the introduction of long-term planning, the overcoming of the global quality of the plans and the improvement of the investment system. The medium period (e.g., 5 or 7 years) cannot bring about qualitative changes in the industrial development of backward areas, and it is just such changes that have to be envisaged and defined in the (long-term) plans. The global approach is appropriate for the setting of proportions in the general economic balance sheets, but it does not represent a basis for the necessary programme work. If the almost extreme intensity of investment initiative obviously represents a positive achievment of the Yugoslav investment system, the problem of directing the investments to the most appropriate industrial and territorial structure has still not been fully resolved.

Improvements are also necessary in the field of methodology of micro-treatment. The institution of investment tenders could have been justified in the initial period as it was just intended to encourage initiative and competition; it has also provided corresponding results. From the locational aspect, however, the contribution has not been very considerable. Only the locations proposed by the participants in the competition for the new plant, the subject of the tender, are compared, without considering systematically all the factors providing an objectively most appropriate location. In addition, the number of economic indi-

10) Walter Isard, "Location and Space-Economy", New York, 1956, p.6.

cators considered to be relevant (so far in most cases only the rate of return and the foreign exchange effect) is not entirely satisfactory. Its increase would bring about considerable difficulties in analyticaly equalizing the practical content indicators of a composity which had not been drafted and designed by the various potential investors after the same technique. The former method of the so-called guaranteed investments, within the federal competence, determining the size and location of each industrial undertaking to be established in an underdeveloped area, was in a position to provide for the application of an exact locational methodology. The new institutional evolution is requirg new methods which would have to be in a position to ensure the same end.

In addition, it has become obvious that it is necessary to have more technical organizations able to deal with the scientific and methodological consideration of micro-location in practical work than it has been the case so far. Some of them have been established only recently.

By resolving these and some other problems, the already considerable results recorded in the development of underdeveloped areas in Yugoslavia so far could be even more enhanced.

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